



Irene Healey – “My strengths are coming up with new designs for prostheses and working with patients to develop products specific to their needs”



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Irene Healey is a visual artist and Certified Clinical Anaplastologist with over 20 years of experience providing restorative lifelike and functional external body prostheses to patients who have lost a part of their body. She tells us more here about how she uses 3D Printing when building a prosthesis.

Irene, could you let us know about your background and what

brought you to 3D printing in the first place?

I am a sculptor and have always been interested in the materials and technologies used to make things. As an art student, I wanted to learn to sculpt the body and understand it. I was fortunate to do my last year of art college in an overseas program in Italy. I stayed there for 8 years wandering the museums and worked with artisans to learn the craft of sculpture. Later when I returned home, I decided to do a medical art degree. There are several programs in North America that train artists in the core courses of medicine so I was able to take the Gross Anatomy and Histology. It seemed a natural fit to combine my skills as an artist with my medical art training and do lifelike facial and body prostheses. The field is called anaplastology and I am a Board Certified Clinical Anaplastologist. After graduating, I led a facial prosthesis department at a Cancer Center for a period. I was able to develop my clinical skills and gained an understanding of hospital-based medicine. I also experienced working

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as part of a multidisciplinary team and I developed an understanding of what patients experience when undergoing cancer treatment or after a traumatic injury.

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Now, I have my own company and I see 3D printing as another tool to use to develop solutions for patients. The artist in me likes the arena of 3D printing as it is a new territory to explore. As a clinician, I believe 3D scanning and 3D printing will enable us to provide care to broader patient groups. Everything used to be custom-made and artisanal. Then we had industrialization and corporatization and pre-made things became the norm. I like how we can venture back to making consumer items (and prosthetics) personalized and customized again and we can obtain mass market customization. It is a new artisanship.

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What was your very first experience with 3D Printing?

I started going to trade shows (I attended my first SME conference in 2007) to get exposure to the field and see where I could fit in. It took a while for me to jump in because of the time commitment and learning curve. My first direct usage of 3D printing was through some grants I received to work with a community college in Hamilton, Canada at Mohawk College’s Additive Manufacturing Resource Center. It was a lot of fun as I had access to equipment that is enormously expensive and I was working again as part of a multidisciplinary team. The next step for me was to buy a Next Engine scanner and a desktop printer and start to play. By getting a scanner, I was able to learn how to manipulate scanned data. I am a very fast sculptor, so I have been scanning things that I hand model, modifying them with software and printing them again. I have given myself time to play and be inventive with 3D printing. I know that through this process I will come up with new applications for 3D printing in anaplastology.

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Could you explain furthermore what **New Attitude Prosthetic Designs Inc is and the services that you are providing?**

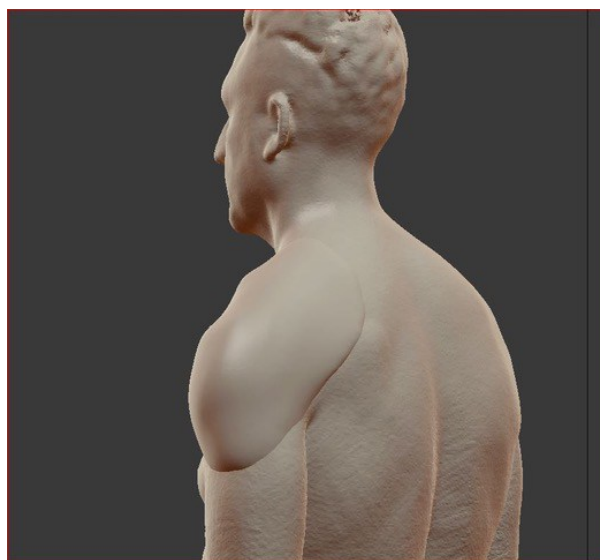
We use new manufacturing technologies to enable access to lifelike and functional external body prostheses that restore the appearance and contribute to the quality of life of patients after the loss of a body part. We work with every type of patient. Every prosthesis has a functional component that provides some type of benefit to the user. An example is a finger prosthesis, which restores the length and enables the person to do tasks with their hand again. There is also an appearance or aesthetic outcome in the prostheses we provide. Recently, we have been doing a lot of prostheses for patients with a sarcoma diagnosis with a soft tissue deficit after their surgery. Often, these deficits can’t be corrected by plastic surgery and we create

wearable prosthetic devices that restore the appearance as well as provide a protective and supportive cover.

In a 2010 New York Times article, journalist Dana Jennings used the term *Curative Aesthetics* in a book review for “When Doctors Become Patients,” written by psychiatrist Dr. Robert Klitzman. Dr. Klitzman writes, “We are not only biological creatures but social, symbolic and aesthetic ones as well.

We ignore any one of these

attributes only at a cost.” If we can obtain all of those attributes in a prosthesis created using 3D printing, then we can proudly say we are serving our patients.



How did you come to build the company?

Initially, my decision to start New Attitude was a desire to work for myself, but soon, I wanted to grow and have people around me with complementary skills. My strengths are coming up with new designs for prostheses and working with patients to develop products specific to their needs. I have sought out people experienced in 3D printing who can support me and complement what I am good at. We see people with a variety of needs and one has to be very inventive. At this stage of my career, after talking with someone and watching them move, I can come up with a design pretty quickly, even for people with unusual needs. I am fortunate to have skilled people around me who do a lot of the fabrication as this lets me focus on my own areas.

Why using 3D printing for the prosthetics?

It is another tool in the toolkit. Knowing what one can do with 3D printing helps to conceptualize new solutions. At present, many of our devices are in medical silicones and that won't change. We are using 3D printing for more of the intermediate steps in the design and fabrication process. 3D printing opens up new possibilities once one is set up to use it. I reverse engineer a lot of patient anatomies and modify the models. I now have records of all the iterations I go through and can go back to an earlier step. I don't have this if I am working out ideas using my hands on a plaster



cast. This makes it easier to quantify what it is that makes a good result and repeat it. There is now a digital record and this makes it easier to transfer “know how” to other people. As we adapt our manufacturing process to include 3D printing, we can make a steady seamless

transition as new capabilities become available.

Do you have any (fun or not) story about the company or your career to share with us?

As anyone who makes things understands – sometimes things just don’t work. It’s like materials have an inner life and they decide occasionally to test us when we become a little bit too self-assured. Traditional silicone castings may decide to not set up or the 3D printer wants to stop and take a break or the filament decides to make a fur ball instead. These moments can be both tragic and comic at the same time.

Have you run into any challenges from being a woman in 3D Printing?

I can honestly say that I haven’t. In general, I have met a lot of really smart people with a lot of expertise and a willingness to help.

Anything exciting coming up you’d like us to know about?

I am initiating a project to develop algorithms to assist in the design of facial prostheses based on a computer analysis of patient scans. We can study the movements of the face to create a functional fit that adjusts to movements with facial expression. We can show the patient proposed designs that are generated to obtain the ideal aesthetic outcome. This will help providers getting into the field of anaplastology who have less experience and also increase the availability of restorative facial prostheses throughout the world where the anaplastology skill set is often not easily available.

What is the most impressive or impactful use of 3D printing you’ve seen so far?

I am in awe of wearable robotic exoskeletons that enable individuals with a spinal cord injury to walk and stand at eye level with others. Anyone working to provide those devices is a real hero.

What do you consider game-changing technologies in Additive Manufacturing?

I am really looking forward to developments in 3D printing in silicone which will enable us to directly print biomimetic soft tissue prostheses.

What makes the 3D printing industry particularly interesting for you?

It is exciting to participate in a field that is still in its infancy where there are rapid change and ongoing innovation and the applications of new technologies have yet to be fully explored and defined.

What do you think of the 3D printing industry today? And how would you like to see it evolve?

I still like all the noise and the frenetic activity in the industry. I think years ago, there was more hyperbole about its applications in healthcare and the consumer market. This creates a lot of false expectations in the general public. I think the conversations are more nuanced today and we recognize the need to be collaborative and inclusive of what other professionals can contribute. This is especially important for anyone entering healthcare, which has its own particular landscape with patient psychology and reimbursement issues, etc. As the technology becomes more accessible, we can bring in more clinicians to have more involvement with 3D printing which can lead to developments that have significant value for patients.

In your opinion, how could we encourage more women to become involved with 3D Printing?

A lot is being done and I applaud what Cyant and Women in 3D Printing are doing. We need to provide young people with access to equipment through libraries, schools, and public innovation centers without a financial barrier to enable them to learn to use equipment and have people around them with the expertise to give support. Children need to see women (and other diverse groups) working with technology so they have role models. Then on a societal level, we need to encourage young girls to not censor themselves, to give themselves fully to their own creativity

and to invest in themselves and their own aspirations. In short, to believe in themselves even when others do not.

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by Nora Toure on May 2, 2018

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